Claims after this response:

Claims

1. (Currently amended) A method for etching a III-V based compound comprising:

creating a mask on said III-V based compound:

placing said III-V based compound and said mask into a reactor having a pressure between about 2 mTorr to about 20 mTorr;

introducing a first gas chosen from HBr, HI, and IBr into said reactor;

introducing second gas of BCl_3 into said reactor; and

exposing said III-V based compound to a gas plasma comprising said first and said second gas to etch smooth high aspect ratio sidewalls, wherein BCl_3 is present in said reactor at a concentration of about 5 percent to about 75 percent by volume.

2. (original) The method of Claim 1 wherein said III-V based compound comprises indium.

3.(original) The method of Claim 1 wherein said gas plasma is generated using a reactive ion etching system.

4.(original) The method of Claim 1 wherein said gas plasma is generated using a combined reactive ion etching and inductively coupled plasma system.

5.(original) The method of Claim 4 wherein a first radio frequency generator is operated in the range from about 0 to 200 watts and a second radio frequency generator is operated in the range from about 50-800 watts.

6.(original) The method of Claim 1 wherein the concentration of said first gas is in the range from about 10 percent to about 75 percent by volume.

7.(Canceled)

8.(original) The method of Claim 1 further comprising introducing CH_4 and H_2 into said reactor.

9.(original) The method of Claim 8 wherein the ratio of said CH_4 to said H_2 is in the range from 5:100 to 70:30.

10.(original) The method of Claim 1 wherein said III-V based compound is heated to an initial temperature of about 60^0C.

11.(previously amended) A method for etching a III-V based compound comprising:

creating a mask on said III-V based compound;

placing said III-V based compound and said mask into a reactor having a pressure between about 2 mTorr to about 20 mTorr;

introducing a first gas chosen from HBr, HI and IBr into said reactor;

introducing second gas of BCl_3 into said reactor;

introducing a third gas of CH_4;

introducing a fourth gas of H_2; and

exposing said III-V based compound to a gas plasma comprising said first, second third and said fourth gas to etch smooth high aspect ratio sidewalls.

12.(original) The method of Claim 11 wherein said III-V based compound comprises indium.

13.(original) The method of claim 11 wherein said gas plasma is generated using a reactive ion etching system.

14.(original) The method of Claim 11 wherein said gas plasma is generated using a combined reactive ion etching and inductively coupled plasma system.

15.(original) The method of Claim 14 wherein a first radio frequency generator is operated in the range from about 0 to 200 watts and a second radio frequency generator is operated in the range from about 50-800 watts.

16.(original) The method of Claim 11 wherein the concentration of said first gas is in the range from about 10 percent to about 75 percent by volume.

17.(original) The method of Claim 1 wherein the concentration of said second gas is in the range from about 5 percent to about 75 percent by volume.

18.(original) The method of Claim 8 wherein the ratio of said third gas to said fourth gas is in the range from 5:100 to 70:30.

19.(Currently amended) A method for etching a III-V based compound comprising:

creating a mask on said III-V based compound;

placing said III-V based compound and said mask into a reactor having a pressure between about 2 mTorr to about 20 mTorr;

introducing a first gas chosen from group VII gaseous species into said reactor;

introducing second gas of BCl_3 into said reactor; and

exposing said III-V based compound to a gas plasma comprising said first and said second gas to etch smooth high aspect ratio sidewalls, wherein BCl_3 is present in said reactor at a concentration of about 5 percent to about 75 percent by volume.

20.(previously amended) A method for etching a III-V based compound comprising:

creating a mask on said III-V based compound;

placing said III-V based compound and said mask into a reactor having a pressure between about 2 mTorr to about 20 mTorr;

introducing a first gas of BCl_3 into said reactor;

introducing a second gas of CH_4;

introducing a third gas of H_2 such that the ratio of said third gas to said second gas is less than one; and

exposing said III-V based compound to a gas plasma comprising said first, second and third gas to etch smooth high aspect ratio sidewalls.

21.(original) The method of Claim 20 wherein the ratio of said second gas to said third gas is about 2:1.